

WHAT IS CLAIMED IS:

1. A ferrule having an interior wall defining a hole, at least a portion of the interior wall comprising a layer of material preferentially softenable relative to the remainder of the ferrule.
2. A ferrule as in claim 1, wherein the material preferentially softenable has a softening temperature lower than a softening temperature of the remainder of the ferrule.
3. A ferrule as in claim 1, wherein the material preferentially softenable has an increased absorption of incident radiation relative to the remainder of the ferrule.
4. A ferrule as in claim 1, wherein the portion of the interior wall further has a softening temperature lower than a softening temperature of a component to be inserted therein.
5. A ferrule as in claim 1, wherein the layer comprises a doped material selected from the group consisting of fused quartz, silica and borosilicate glass.
6. A ferrule as in claim 5, wherein the layer is doped with a dopant selected from the group consisting of germanium, boron, phosphorous, fluorine and combinations thereof.
7. A ferrule as in claim 6, wherein the layer comprises between about 2% and about 4% total dopant by weight.
8. A ferrule as in claim 6, wherein the layer comprises between about 2% and about 4% germanium and trace amounts of boron and phosphorous.

9. A ferrule as in claim 1, further comprising at least one of a filament, an optical fiber and a capillary tube inserted into the hole and fused therein by at least partially softening the layer.

10. A fiber Bragg grating device comprising:

a ferrule having an interior wall defining a hole, at least a portion of the interior wall comprising a layer of material preferentially softenable relative to the remainder of the ferrule; and

a fiber including a Bragg grating disposed within the hole of the ferrule and fused to the ferrule by at least partially softening the layer.

11. A device as in claim 10 wherein the Bragg grating is formed after the fiber and ferrule are fused.

12. A device as in claim 10 wherein the material preferentially softenable has at least one of: a softening temperature lower than a softening temperature of the remainder of the ferrule, and, an increased absorption of incident radiation relative to the remainder of the ferrule.

13. A method of fusing an optical fiber into a ferrule having an interior wall defining a hole, at least a portion of the interior wall comprising a layer of material preferentially softenable relative to the remainder of the ferrule, comprising:

disposing a portion of the optical fiber within the hole;

heating the layer such that at least a portion of the layer softens and flows between the interior wall and the optical fiber; and

allowing the softened portion to solidify to form a fused region between the ferrule and the optical fiber.

14. A method as in claim 13, wherein the heating comprises directing energy from a CO₂ laser onto the ferrule.
15. A method as in claim 13, wherein the layer of material preferentially softenable has at least one of: a softening temperature lower than a softening temperature of the remainder of the ferrule, and, an increased absorption of incident radiation relative to the remainder of the ferrule.
16. A method as in claim 14, wherein the heating comprises directing energy from at least one of: a radio wave source, a microwave source, a gas torch, a resistive element, a plasma source, a laser, an electric arc generator, or an electromagnetic energy source onto the ferrule.
17. A method of manufacture, comprising:
- providing a preform including an interior wall defining a hole;
 - depositing a material preferentially softenable relative to the remainder of the ferrule onto at least a portion of the hole;
 - drawing the preform; and
 - cutting the drawn preform to form a plurality of ferrules.
18. A method as in claim 17 wherein the depositing is performed prior to the drawing.
19. A method as in claim 17 wherein the drawing is performed prior to the depositing.
20. A method as in claim 17, wherein the material preferentially softenable has at least one of: a softening temperature lower than a softening temperature of the remainder of the ferrule, and, an increased absorption of incident radiation relative to the remainder of the ferrule.
21. A method as in claim 17, further comprising:

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disposing a portion of a filament within the hole of one of the ferrules;

heating the layer such that at least a portion softens and flows between the interior wall and the filament; and

allowing the softened portion to solidify to form a fused region between the ferrule and the filament.

22. A method as in claim 21 wherein the filament comprises one of an optical fiber and a capillary tube.

23. A method as in claim 21 wherein the heating comprises directing a beam from a CO₂ laser onto the ferrule.

24. A method as in claim 21 wherein the heating further comprises directing energy from an energy source comprising at least one of: a radio wave source, a microwave source, a gas torch, a resistive element, a plasma source, a laser, an electric arc generator, or an electromagnetic energy source onto the ferrule.

25. A method of manufacture, comprising:

providing a tubular member including interior walls defining one or more holes;

depositing a material preferentially softenable relative to the tubular member onto the interior wall by chemical vapor deposition; and

cutting the tubular member to form a plurality of ferrules.

26. A method as in claim 25, wherein the material preferentially softenable has at least one of: a softening temperature lower than a softening temperature of the tubular member, and, an increased absorption of incident radiation relative to the tubular member.

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